

DEC 16 1992



15 December 1992

Mr. Charles B. Schwer
Agency of Natural Resources
Department of Environmental Conservation
Hazardous Materials Division
103 South Main Street/West Building
Waterbury, Vermont 05671-0404

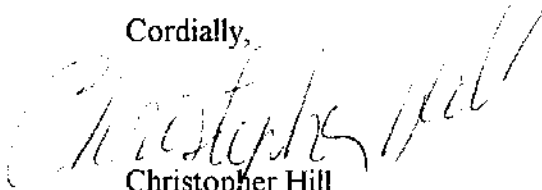
RE: Calco, Inc. Waterford, Vermont.
VTDEC Site #77-0086

Dear Mr. Schwer:

Please find enclosed Griffin International's Report on the Investigation of Residual Subsurface Petroleum Contamination at the above referenced site. A copy of this report has been received and reviewed by Calco, Inc.

If you have any questions, please call.

Cordially,


Christopher Hill
Hydrogeologist

Enclosure

REPORT
ON THE INVESTIGATION OF
RESIDUAL SUBSURFACE PETROLEUM
CONTAMINATION

CALCO, INC.
WATERFORD, VERMONT

VTDEC SITE #77-0086
GRIFFIN PROJECT #9924276

DECEMBER 1992

Prepared By:

GRIFFIN INTERNATIONAL, INC.

2B Dorset Lane
Williston, Vermont 05495

(802) 879-7708

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EXECUTIVE SUMMARY

Eight petroleum underground storage tanks (USTs) were permanently removed from the Calco property in Waterford, Vermont on 8 and 10 July 1992. No replacement tanks are being installed. During removal, residual petroleum contamination was detected in soils and groundwater surrounding and beneath several of the former USTs.

The initial follow-up investigation indicates that residual, dissolved phase, petroleum contamination exists in groundwater in the vicinity of former USTs one through five. However, contaminant concentrations below USTs one and two are below Vermont drinking water standards. Contaminant concentrations in groundwater beneath former USTs 3, 4, and 5 were relatively low, with only a few compounds exceeding the Vermont drinking water standards. No water quality data has yet been obtained from beneath former USTs 6, 7, or 8. Data collected during the removal of USTs 6, 7, and 8 suggest that little or no petroleum contamination exists in the vicinity of these USTs. No sensitive receptors appear to have been impacted. No off property migration appears to have occurred. No free phase product was detected in the monitoring wells sampled. The on site water supply well does not appear at risk. No other water supply wells were located in the downgradient direction which might be at risk.

Nearby Stiles Pond is potentially in the path of migration of residual petroleum contamination. Stiles Pond is the water source for the St. Johnsbury Municipal Water Supply System. The risk to Stiles Pond is considered low, and data from this phase of the investigation suggests that no impact to Stiles Pond or its tributary, Duck Pond Brook, has occurred. However, as a precautionary measure, Griffin is recommending the installation of three additional monitoring wells and the collection of an additional round of groundwater samples to help delineate the limits of any residual petroleum contamination.

Residual petroleum contamination of soils stockpiled on-site has declined significantly since their polyencapsulation in July 1992 and is now below the Vermont Guideline level of 10 ppm for the backfilling of diesel contaminated soils. These soils should therefore be released from the polyencapsulation requirement.

INTRODUCTION

This report details the investigation of residual subsurface petroleum contamination at the Calco, Inc. facility in Waterford, Vermont. This work has been conducted by Griffin International, Inc. (Griffin) at the request of Calco, Inc. (Calco) in response to the 24 July 1992 letter to Mr. Ken Wood of Calco from the Vermont Department of Environmental Conservation (VTDEC). In that letter, the VTDEC requested that investigative work be conducted in response to the discovery of residual petroleum contamination in the subsurface following the removal of eight petroleum underground storage tanks. The work has been conducted in accordance with the Work Plan submitted to and approved by the VTDEC.

SITE BACKGROUND

Site Description

The subject Calco facility is located approximately six miles southeast of St. Johnsbury, Vermont on State Route 18 (See Site Location Map, Page A1, Appendix). Calco is a manufacturer of precast concrete structures founded in 1954. Calco first occupied this property in 1965, prior to which it was farm land. The facility is set back approximately seven hundred feet to the west of Route 18. The area surrounding the facility is entirely rural. The only other structures in the area of the Calco property are a few residential buildings along the east side of Vermont Route 18. A paved landing strip exists to the west of the facility but is no longer in use.

To the west of the facility, beyond the landing strip, is a narrow wetland area and Duck Pond Brook. Also west of the landing strip is a pond, within the boundaries of the wetland, is a small pond. This pond is referred to in this text as the local pond. Duck Pond is 2,500 feet to the southwest. Stiles Pond, which is the water source for the St. Johnsbury Municipal Water Supply System (WSID #5045), is approximately 7/8 of a mile or about 4,800 feet downstream to the north-northwest.

The surficial geology of the site is mapped as well sorted glaciolacustrine sand with no pebbles or boulders. The wetland area to the west and northwest (toward Stiles Pond, See Site Location Map) is mapped as swamp, peat, and/or muck. The area on which this investigation focuses is the approximately 1 acre section of the 30 acre property where the former petroleum USTs were located (See Site Map, Page A2, Appendix).

Site History

A Site Inspection and investigation was conducted on the Calco property by the VTDEC in 1986. The investigation focused on approximately 247 abandoned drums which existed at the site. The location of the now removed drums is indicated on the attached Site Location Map. The Investigation concluded that no significant contamination of soil or groundwater had occurred at the location where the drums were formerly stored. The report on the 1986 investigation by the VTDEC is on file at the Hazardous Materials Management Division offices in Waterbury, Vermont. The former drum storage site appears to be well downgradient of the area under study by Griffin, and therefore should not have any impact on the outcome of this investigation.

On July 8th and 10th of 1992, eight petroleum USTs were removed from the Calco site. Summary data on the age, content and size of the USTs removed appears in Table 1.

UST #	Volume (Gals)	Contents	Date Installed	Date Decommissioned	Date Removed
1	12,000	Diesel	1974	7/92	7/92
2	12,000	Diesel	1974	7/92	7/92
3	4,000	Unleaded Gas	1966	10/91	7/92
4	1,000	Unleaded Gas	1966	10/91	7/92
5	1,000	Unleaded Gas	1966	10/91	7/92
6	4,000	Aviation Gas (100LL)	1974	1978	7/92
7	4,000	Diesel	1966	1978	7/92
8	10,000	Waste Oil	1976	7/92	7/92

Table 1. Summary of UST Data

All of the USTs, except the waste oil tank, had been used for supplying fuel for the operation of company vehicles and on-site machinery. Two USTs remain on site: a 3,000 gallon #2 fuel oil UST (permitted), and a 1,000 gallon #2 fuel oil UST (exempt from permitting requirement). These tanks are located to the north of the area under study, adjacent to the Calco Plant #2 and the Calco Office.

Monitoring wells, installed as part of a leak detection program, are installed around former USTs one through five. Monitoring well locations are indicated on the attached Site Map.

Oversight services of the tank removals were provided by Griffin International. Additional details of the tank removals appear in Griffin's tank closure report dated 19 June 1992.

INVESTIGATIVE PROCEDURES

In an effort to determine the degree of residual petroleum contamination at the site, Griffin collected groundwater samples from the six pre-existing monitoring wells. Groundwater samples were analyzed for the presence of petroleum related compounds. Survey data for a site map was collected and a review of sensitive receptors was completed. Details and results of the work completed follow.

Existing Monitoring Wells

Existing monitoring wells 1, 2, and 3 were installed by Green Mountain Boring, Inc. of Barre, VT in July of 1991. Monitoring well 4, 5, and 6 were also installed by Green Mountain Boring and were reportedly installed in 1988. Both sets of wells were installed for leak detection purposes. Drillers logs, recorded during installation, are attached (Pages A6-A8, Appendix). The drillers logs indicate that material in the subsurface consists of fine sands with stones and cobbles. This agrees well with the mapped geology of the site which indicates fine sands.

Groundwater Sampling and Analyses

On 12 October 1992, Griffin collected groundwater samples from each of the six existing monitoring wells. All samples collected were analyzed according to EPA Method 602 and 418.1 which test for benzene, toluene, ethylbenzene, xylenes (the BTEX compounds), MTBE (methyl tertiary butyl ether, an anti-knock gasoline additive) and total petroleum hydrocarbons. All samples were collected according to Griffin's groundwater sampling protocol which includes well development prior to sample collection.

The laboratory analyses of the groundwater samples collected from MW-1, MW-2, and MW-3, which surrounded the former unleaded gasoline USTs, indicate the presence of the BTEX compounds dissolved in groundwater. Benzene was the only compound detected at concentrations above the Vermont Drinking Water Standards in all three of the monitoring wells. Xylenes were above the Vermont Drinking Water Standards in MW-1. MTBE was above the Vermont Drinking Water Standard in MW-3. The concentrations of all other detected compounds were below the Drinking Water Standards for these compounds. Total Petroleum

Hydrocarbons (T.P.H.) were only detected in MW-1 and MW-3. Water quality results are tabulated, along with Vermont Drinking Water Standards for the tested compounds, on Page A5 of the Appendix.

The results of laboratory analyses of groundwater samples collected from MW-4, MW-5, and MW-6 also appear in the Groundwater Quality Summary Table. These results indicate very low levels of residual petroleum contamination in groundwater in the vicinity of these wells. All observed contaminant concentrations in these monitoring wells were below Vermont Drinking Water Standards for the detected compounds.

Duplicate, trip blank and equipment blank samples indicate that adequate Quality Assurance/Quality Control was maintained during sample collection and analyses. A trace amount of benzene was detected in the equipment blank sample, but is not considered to significantly diminish the value of the water quality data. Groundwater samples were analyzed by the laboratory 15 days after collection which exceeds the EPA recommended maximum holding time by one day. No free phase product was detected during collection of the groundwater samples.

Determination of Groundwater Flow Direction and Gradient

Prior to groundwater sampling, Griffin measured the relative water table elevations in wells MW1 through MW6. Measurements were made relative to a benchmark (top of casing at MW4), which was assigned an arbitrary elevation of 100 feet. Water level data is presented on page A4 of the Appendix.

The water table elevation in each monitoring well was calculated by subtracting the depth to water measurement (made from top of casing) from the assigned top of casing elevations. Using the water table elevations from each monitoring well, the groundwater contour map on page A3 of the Appendix was developed. Groundwater was encountered at depths ranging from three to thirteen feet below grade, and appears to be flowing westerly, towards the wetland and pond.

The large differences apparent in the water table elevations between the two groups of monitoring wells (MW1, MW2, MW3 and MW4, MW5, MW6) suggests the presence of a perched water table beneath the former Diesel UST locations. This could compromise the validity of the groundwater flow direction determination made using the water level data from those wells. However, the water level data within each well group, the westward sloping topography, and the

wetlands to the west, all support the conclusion the groundwater flow beneath the former USTs is westerly. The perched water table causes the water table gradient to be very steep near the edge of the aquitard. The calculated water table gradient beneath the former USTs is 8.25%.

PID Screening of Adjacent Wetland and Pond

On 12 October, Griffin used a Photovac MicroTIP Model HL2000 photoionization detector (PID) to screen soils at the edge of the nearby wetland and pond for residual hydrocarbon vapors. During screening of soils in the adjacent wetland, no elevated PID readings were detected. During the screening, a thorough visual inspection was completed. During this inspection no signs of residual petroleum contamination such as petroleum sheens, stressed or dead vegetation or petroleum odors were detected.

PID Screening of Stockpiled Soils

During the removal of the former USTs #1 and #2 (Diesel USTs) approximately ten cubic yards of petroleum contaminated soils were polyencapsulated on-site. PID readings on the day of polyencapsulation (10 July 1992) were up to 17 parts per million (ppm) as measured using an Hnu Model PI101 PID.

During Griffin's site visit, an Eijkelkamp Dutch Auger Soil Sampler was used to obtain soil core samples from within these stockpiled soils. The soil cores obtained from the stockpiled soils were screened with the Photovac MicroTIP Model HL2000 PID. The screening was accomplished by placing the soil core samples into sealed plastic bags and agitating the samples. The probe of the PID was then inserted into the bag to measure the hydrocarbon vapor concentration produced by the soil core sample. PID readings obtained during the screening appear in Table 2.

Sample Identification	Sample Collection Depth (feet)	PID reading (ppm)
# 1	3.0	0.7
# 2	3.0	0.3
# 3	3.0	0.2
# 4	3.0	0.4
# 5	3.0	0.5

Table 2. PID readings from screening of stockpiled soils
Screening Date: 12 October 1992

The PID readings observed on 12 October 1992 are significantly lower than those observed in July 1992. This suggests that the processes of biodegradation, photodegradation, and volatilization have significantly reduced the concentrations of volatile organic compounds in these soils.

RISK ASSESSMENT

The risk that the residual, dissolved phase, petroleum contamination in groundwater beneath the former UST pits poses to the on-site water supply well is minimal, since it is both distant (approximately 750 feet) and upgradient.

The risk that the residual petroleum contamination poses to the adjacent Calco facility also appears minimal. This assessment is based on the overall low PID readings observed in soils during the tank removals, the absence of a basement in the adjacent building which might serve as a point of collection for petroleum vapors, the absence of free phase product in any monitoring wells, and the locations of the tank pits, none of which are hydraulically upgradient of the Calco facility. There are no other structures in the westward path that residual petroleum contamination is likely to follow.

The wetland to the west, the local pond within the wetland, and Stiles Pond which is downstream, are in the path that any residual petroleum contamination is most likely to follow. Based on the absence of free phase product in any monitoring wells and the relatively low concentrations of dissolved phase compounds in groundwater beneath former USTs one through five, the risk to these receptors appears minimal. The natural processes of dispersion, dilution, volatilization and biodegradation, will likely reduce dissolved phase contaminant concentrations in groundwater to below detectable levels before they migrate any significant distance from the tank pits. PID screening and visual inspection of the wetland and pond to the west indicate that residual petroleum contamination has not reached these receptors in detectable levels.

CONCLUSIONS

Based on the information gathered during this limited site assessment, Griffin has reached the following conclusions:

1. Eight petroleum underground storage tanks were excavated and removed from the Calco property on 8 and 10 July 1992. During removal, varying levels of residual petroleum

contamination were detected in soils surrounding several of the former USTs. The highest hydrocarbon vapor concentrations were observed in the vicinity of the former unleaded USTs (3, 4, 5). A petroleum sheen was observed on groundwater beneath former USTs #1 and #2. Little or no residual petroleum contamination was observed in soils excavated from the remaining UST pits.

2. Groundwater samples collected from monitoring wells surrounding USTs one through five indicate the presence of relatively low concentrations of dissolved phase residual petroleum contamination in groundwater beneath those former USTs. Dissolved phase contaminant concentrations in groundwater beneath the former unleaded gasoline tanks (USTs 3, 4, 5) are above Vermont Drinking Water Standards for several compounds. Dissolved phase contaminant concentration in groundwater beneath former USTs 1 and 2 were below Vermont Drinking Water Standards for all tested compounds.
3. No free phase petroleum products were detected in any existing monitoring wells near former USTs one through five.
4. No groundwater quality data is available in the vicinity of, or downgradient of, former USTs 6, 7, or 8. Data obtained during the removal of these USTs suggests that groundwater contamination in the vicinity of these USTs should be minimal or absent.
5. Subsurface materials at the site appear to consist of fine sand with occasional stones and cobbles, as noted on drillers logs. Groundwater flow direction appears to be westerly.
6. The wetland to the west of the site, and Stiles pond, are potentially in the path of migration of residual petroleum contamination. However, the risk to these receptors is considered low, due to the relatively low contaminant concentrations observed in groundwater beneath the former UST locations and the absence of free phase product in existing on site monitoring wells. The natural processes of dispersion, dilution, biodegradation, and volatilization will likely prevent contaminants from reaching any of the downgradient receptors in detectable concentrations, and should significantly reduce contaminant concentrations over time. The distance between the observed residual petroleum contamination and the sensitive receptors downgradient will help prevent the contamination from reaching those receptors. The absence of free phase product should facilitate the reduction of contaminant concentrations in groundwater.

7. The downgradient extent of residual petroleum contamination is not known.
8. Hydrocarbon concentrations in soils stockpiled on site during the tank removals have declined significantly and are now below the Vermont Guideline Level of 10 ppm for the backfilling of diesel contaminated soils.

RECOMMENDATIONS

Based on the information collected during this site assessment, Griffin recommends the following:

1. Based on the absence of free phase product in on-site monitoring wells and the relatively low concentrations of dissolved phase contaminants, active remediation at this site does not appear warranted at this time.
2. Since Stiles Pond serves as the source for the St. Johnsbury Municipal Water Supply System, and is potentially in the path of residual petroleum migration, Griffin believes it is important to better define the downgradient extent of any residual petroleum contamination. To accomplish this, Griffin is recommending the installation of three additional downgradient monitoring wells. The locations for the proposed wells are indicated on the Proposed Well Locations Map on Page A6 of the Appendix.

Proposed monitoring well MW7 would be placed to the west of former UST #6. Data obtained from this well will help to establish whether there is any significant downgradient contamination as a result of the operation of that UST. No Elevated PID readings were recorded during removal of UST #6, however a small, pin size, hole was observed in this UST after removal.

Proposed MW-8 would be placed to the west, and downgradient of, former USTs #1 through #7. Data collected from this well will help to establish the limits of any downgradient petroleum contamination from those USTs.

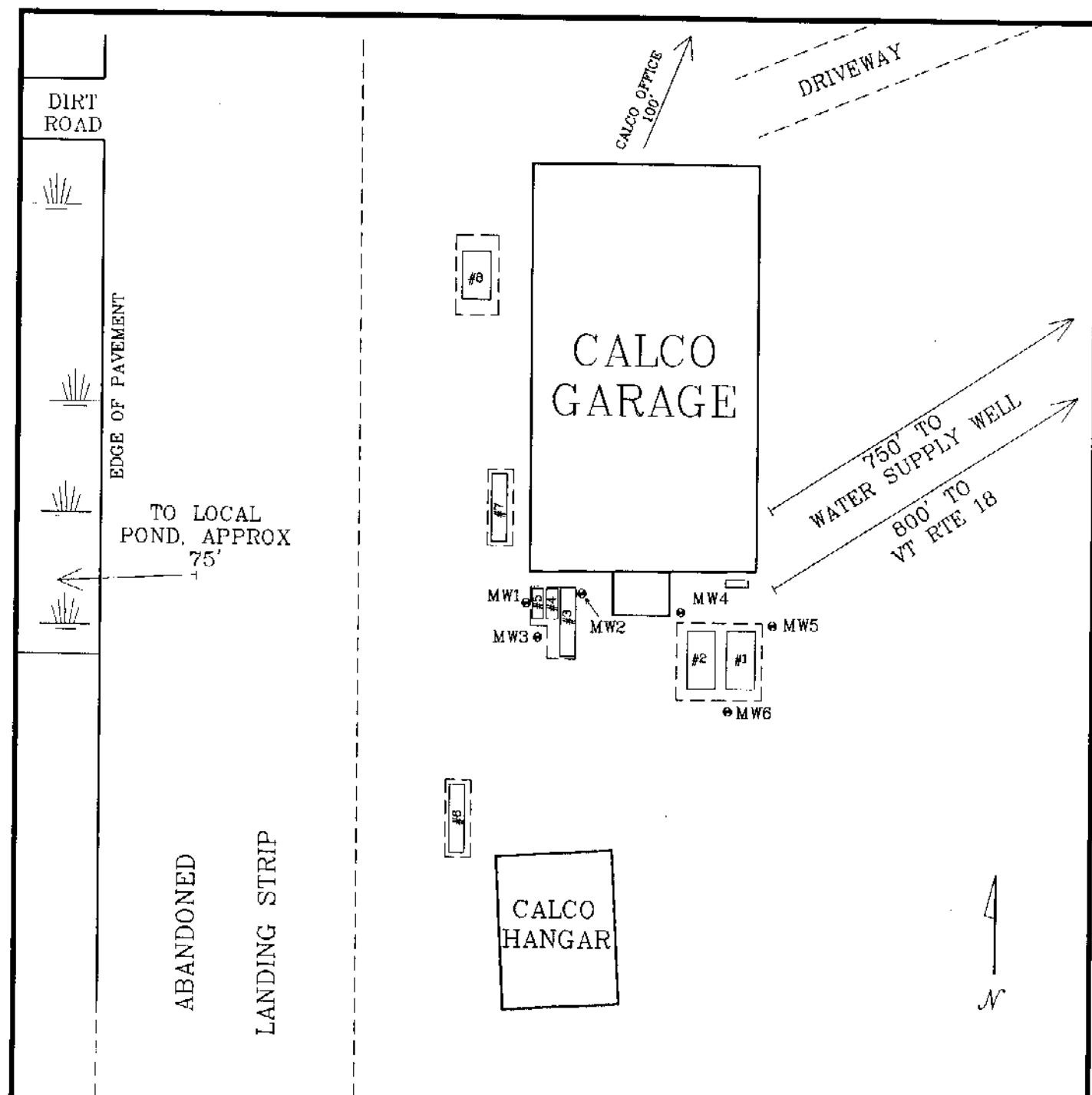
Proposed MW9 would be placed to the west, and downgradient of, former UST #8. Data from this monitoring well would be used to determine the downgradient extent of any residual petroleum contamination from this UST, if any.

3. After installation of the monitoring wells, groundwater samples should be collected from all new and existing monitoring well. All samples should be analyzed according to EPA Method 602 except for the sample collected from proposed MW9 which should be analyzed according to EPA Method 624 which tests for compounds associated with waste oil contamination.. EPA Method 602 tests for petroleum related compounds.

Once data is available from the installation and sampling of the proposed monitoring wells, recommendations regarding further actions and the need for a long term monitoring program can be formulated.

The stockpiled soils which remain polyencapsulated at the site should be released from the polyencapsulation requirement. Once released, they can either remain piled at their current location or else spread out on site. If these soils are to be spread out on-site, they should be spread out at a location set well back from the wetlands and pond to the west in the unlikely event that there are elevated levels of petroleum contamination in these soils that went undetected during Griffin's screening.

APPENDIX



NOTES:

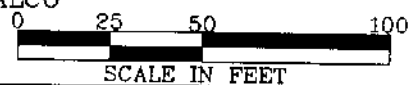
FORMER UST #	VOLUME (GAL'S)	CONTENT	DATE INSTALLED	DATE DECOMMISSIONED
1	12,000	DIESEL	1974	7/82
2	12,000	DIESEL	1974	7/82
3	4,000	UNLEADED GAS	1966	10/91
4	1,000	UNLEADED GAS	1966	10/91
5	1,000	UNLEADED GAS	1966	10/91
6	4,000	AVIATION GAS (100LL)	1974	1978
7	4,000	DIESEL	1966	1978
8	10,000	WASTE OIL	1976	7/92

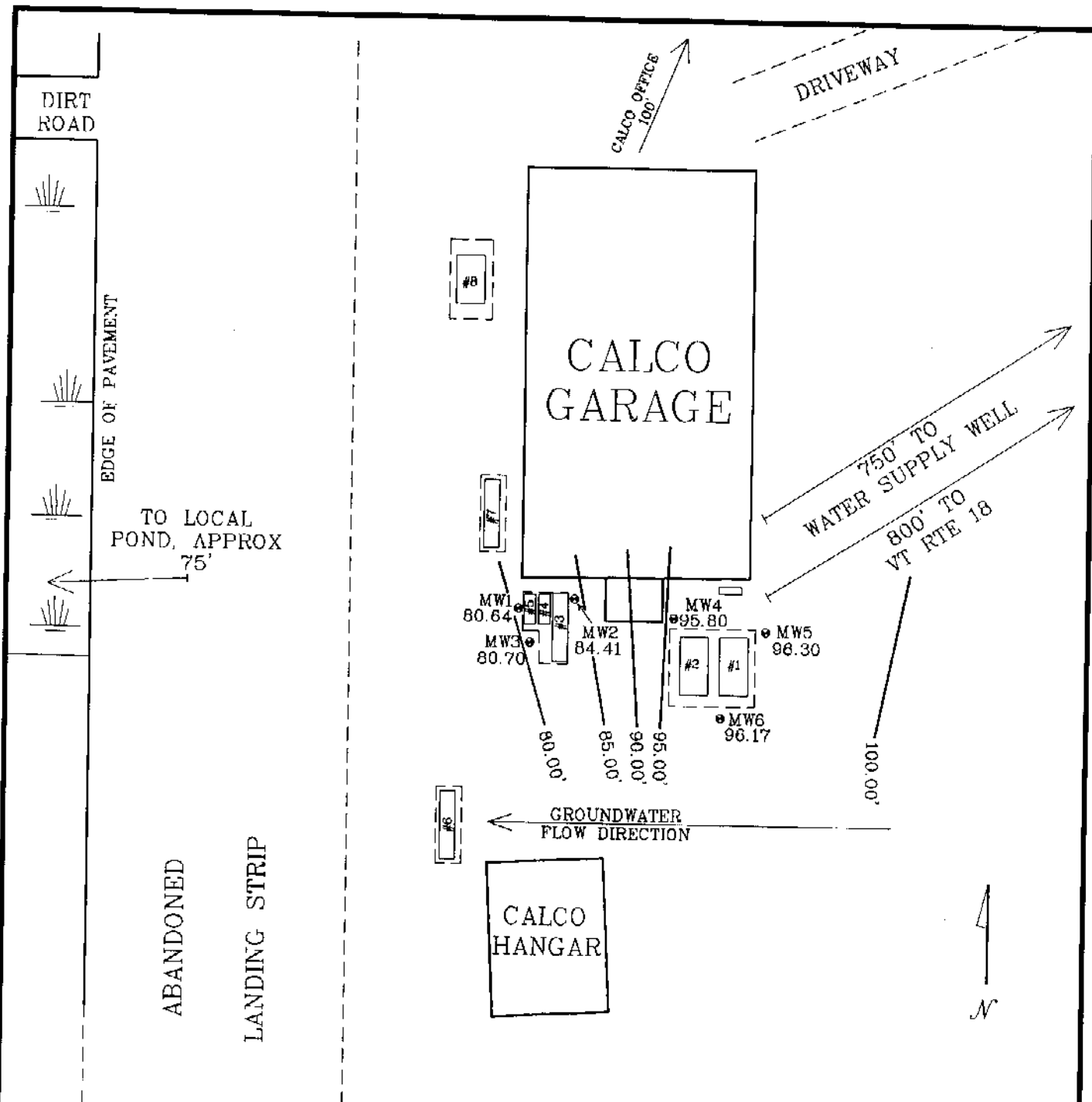
AREA/SITE MAP

CALCO, INC.
WATERFORD, VERMONT

MW3 } MONITORING WELL WITH I.D.

GRIFFIN PROJECT #9924276
DRAWN: 12/3/92
REF: CALCO





NOTES:

FORMER UST #	VOLUME (GAL'S)	CONTENT	DATE INSTALLED	DATE DECOMMISSIONED
1	12,000	DIESEL	1974	7/92
2	12,000	DIESEL	1974	7/92
3	4,000	UNLEADED GAS	1968	10/91
4	1,000	UNLEADED GAS	1968	10/91
5	1,000	UNLEADED GAS	1968	10/91
6	4,000	AVIATION GAS (100LL)	1974	1978
7	4,000	DIESEL	1968	1978
8	10,000	WASTE OIL	1976	7/92

GROUNDWATER CONTOUR MAP

CALCO, INC.
WATERFORD, VERMONT

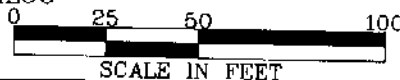
MW3 } MONITORING WELL WITH I.D. AND
96.53 } WATER TABLE ELEVATION IN FEET

MONITORING DATE: 10/12/92

GRIFFIN PROJECT #9924276

DRAWN: 12/3/92

REF: CALCO



**Liquid Level Monitoring Data
Calco, Inc.
Waterford, Vermont**

Monitoring Date: 12 October 1992

Well I.D.	Well Depth	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Hydro Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	-	99.46	-	18.82	-	-	-	-	80.64
MW-2	-	99.56	-	15.15	-	-	-	-	84.41
MW-3	-	99.20	-	18.50	-	-	-	-	80.70
MW-4	-	100.00	-	4.20	-	-	-	-	95.80
MW-5	-	99.58	-	3.28	-	-	-	-	96.30
MW-6	-	99.02	-	2.85	-	-	-	-	96.17

All Values Reported in Feet

Groundwater Quality Summary
Calco, Inc.
Waterford, Vermont

Sampling Date: 12 October 1992

PARAMETER	Location						Vermont Health Advisory Levels
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	
Benzene	31.5	65.3	84.9	1.3	2.1	1.8	5.0*
Chlorobenzene	ND	ND	ND	ND	ND	ND	100**
1,2-DCB	ND	ND	ND	ND	ND	ND	-
1,3-DCB	ND	ND	ND	ND	ND	ND	-
1,4-DCB	ND	ND	ND	ND	ND	ND	-
Ethylbenzene	126.	44.4	38.4	ND	ND	ND	680**
Toluene	388.	53.3	42.1	ND	20.3	ND	2,420**
Xylenes	1,090.	210.	34.7	ND	ND	ND	400**
Total BTEX	1,636.	373	200.1	1.3	22.4	1.8	-
MTBE	ND	ND	81.8	ND	ND	ND	40**
BTEX+MTBE	1,636.	373	281.9	1.3	22.4	1.8	-
T.P.H.	25.	ND	2.7	5.1	2.0	ND	-

All Values Reported in ug/L (ppb) Except T.P.H. reported in mg/L (ppm)

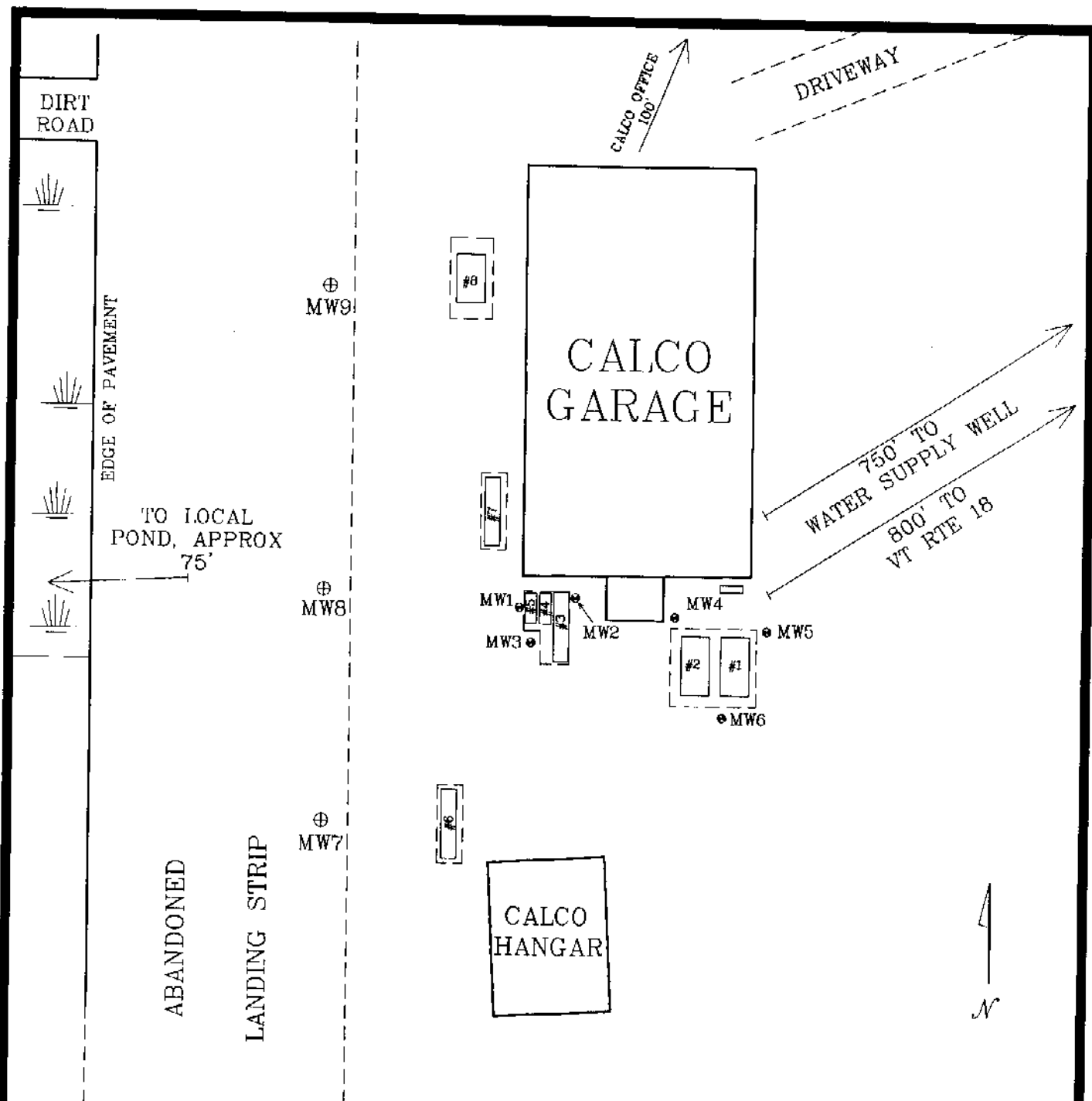
* - Maximum Contaminant Level

ND - None Detected

** - Health Advisory Level

Quality Assurance and Control Samples

PARAMETER	Equipment Blank	Trip Blank	Duplicate (MW-5)
Benzene	TBQ	ND	2.2
Chlorobenzene	ND	ND	ND
1,2-DCB	ND	ND	ND
1,3-DCB	ND	ND	ND
1,4-DCB	ND	ND	ND
Ethylbenzene	ND	ND	ND
Toluene	ND	ND	19.6
Xylenes	ND	ND	ND
Total BTEX	ND	ND	21.3
MTBE	ND	ND	ND
BTEX+MTBE	ND	ND	21.3
T.P.H.	ND	ND	1.2



NOTES

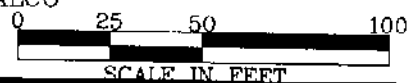
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5	1,000	UNLEADED GAS	1966	10/91
6	4,000	AVIATION GAS (100LL)	1974	1978
7	4,000	DIESEL	1966	1978
8	10,000	WASTE OIL	1976	7/92

PROPOSED MONITORING WELL LOCATIONS

CALCO, INC.
WATERFORD, VERMONT

* MW3 } MONITORING WELL WITH I.D.

⊕ - PROPOSED MONITORING WELL LOCATION
GRIFFIN PROJECT #9924276
DRAWN: 12/3/92
REF: CALCO



R. D. 2 - BARRE, VERMONT 05641

OUR JOB NO. 91-155

LOCATION OF BORING: Upgrade East of tanks in front of welding shop

HOLE NO. *MCW-1*

HOLE NO. MW-7

Green Mountain Boring Co., Inc.

R. D. 2 - BARRE, VERMONT 05641

SHEET 2 OF 3
DATE 7-2-91
HOLE NO. MW-2
LINE & STA.
OFFSET None

TO Calco, Inc.

PROJECT NAME Monitoring Wells

REPORT SENT TO Calco, Inc.

SAMPLES SENT TO

ADDRESS Waterford, VT

LOCATION Waterford, VT

PROJ. NO.

OUR JOB NO. 91-155

GROUND WATER OBSERVATIONS

At 20' at 1/2 Hours

At at Hours

Type

Size I. D.

Hammer Wt.

Hammer Fall

CASING

SAMPLER

CORE BAR

AUGERS

SPLIT SPOON

4.25"

1 3/8"

140#

30"

SURFACE ELEV.

DATE STARTED 7-2-91

DATE COMPL. 7-8-91

BORING FOREMAN Garneau

INSPECTOR

SOILS ENGR.

LOCATION OF BORING: Down grade Southeast of tanks in front of welding shop

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From	To					No.	Pen	R
				0-6	6-12	12-18			Augered through fine sands with stones and cobbles. Hard slow drilling.			
									Augered to 24'			
									Set well at 24'			
									<u>Materials Used</u>			
									3 bags grade 2 silica sand			
									10' .020 screen 2" p.v.c.			
									14' riser 2" p.v.c.			
									1 top wing type cap			
									1 bottom push on cap			
									20 lbs. bentonite			
									1 curb box (M-65)			
									cement			

GROUND SURFACE TO 24'

USED 4.25"

AUGERS: THEN set well

Sample Type

D=Dry C=Cored W=Washed

UP=Undisturbed Piston

TP=Test Pit A=Auger V=Vane Test

UT=Undisturbed Thinwall

Proportions Used

trace 0 to 10%

little 10 to 20%

some 20 to 35%

and 35 to 50%

140 lb. Wt. x 30" fall an 2" O. D. Sampler

Cohesionless Density

0-10 Loose

10-30 Med. Dense

30-50 Dense

50+ Very Dense

Cohesive Consistency

0-4 Soft 30+ Hard

4-8 M/Stiff

8-15 Stiff

15-30 V-Stiff

SUMMARY:

Earth Boring 24'

Rock Coring

Samples 0

HOLE NO. MW-2



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 27, 1992

PROJECT CODE: GICA1455
REF.#: 37,032
STATION: MW 1
TIME SAMPLED: 11:40
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	5	31.5
Chlorobenzene	10	ND ²
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	5	126.
Toluene	5	388.
Xylenes	5	1,090.
MTBE	25	ND

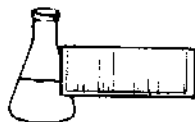
NUMBER OF UNIDENTIFIED PEAKS FOUND: >25

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 20% dilution.
- 2 None detected

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ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
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FAX 879-7103

LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 27, 1992

PROJECT CODE: GICA1455
REF.#: 37,034
STATION: MW 2
TIME SAMPLED: 12:00
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	10	65.3
Chlorobenzene	20	ND ²
1,2-Dichlorobenzene	20	ND
1,3-Dichlorobenzene	20	ND
1,4-Dichlorobenzene	20	ND
Ethylbenzene	10	44.4
Toluene	10	53.3
Xylenes	10	210.
MTBE	50	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 6

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 10% dilution.
2 None detected

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LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 27, 1992

PROJECT CODE: GICA1455
REF.#: 37,035
STATION: MW 3
TIME SAMPLED: 12:22
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	5	84.9
Chlorobenzene	10	ND ²
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	5	38.4
Toluene	5	42.1
Xylenes	5	34.7
MTBE	25	81.8

NUMBER OF UNIDENTIFIED PEAKS FOUND: >25

NOTES:

- 1 Detection limit raised due to high levels of contaminants. Sample run at 20% dilution.
2 None detected

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LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 28, 1992

PROJECT CODE: GICA1455
REF.#: 37,037
STATION: MW 4
TIME SAMPLED: 13:00
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	1.3
Chlorobenzene	2	ND ¹
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	5	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected

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LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 27, 1992

PROJECT CODE: GICA1455
REF.#: 37,036
STATION: MW 5
TIME SAMPLED: 12:25
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	2.1
Chlorobenzene	2	ND ¹
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	20.3
Xylenes	1	ND
MTBE	5	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 8

NOTES:

1 None detected

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LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 28, 1992

PROJECT CODE: GICA1455
REF.#: 37,033
STATION: MW 6
TIME SAMPLED: 11:52
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	1.8
Chlorobenzene	2	ND ¹
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	5	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected

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LABORATORY REPORT

TOTAL HYDROCARBONS - EPA METHOD 418.1

CLIENT: Griffin International
REPORT DATE: October 29, 1992
PROJECT NAME: Calco, Inc.
PROJECT CODE: GICA1456
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
DATE ANALYZED: October 23-26, 1992
SAMPLER: Don Tourangeau/Peter Warren

Reference number:

37,040
37,041
37,042
37,043
37,044
37,045
37,046
37,047
37,048

Concentration (mg/L)¹

ND²
25.
ND
2.7
5.1
2.0
ND
1.2
ND

Sample ID:

37,040: Trip Blank; 08:05
37,041: MW #1; 11:40
37,042: MW #6; 11:52
37,043: MW #2; 12:00
37,044: MW #3; 12:22
37,045: MW #5; 12:25
37,046: MW #4; 13:00
37,047: Duplicate; 12:25
37,048: Equipment Blank; 13:05

Notes:

- 1 Method detection limit is 0.8 ppm
- 2 None detected

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LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 28, 1992

PROJECT CODE: GICA1455
REF.#: 37,039
STATION: Equipment Balnk
TIME SAMPLED: 13:05
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	TBQ ²
Chlorobenzene	2	ND ¹
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	5	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

- 1 None detected
- 2 Trace below quantitation limits

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LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 27, 1992

PROJECT CODE: GICA1455
REF.#: 37,031
STATION: Trip Blank
TIME SAMPLED: 8:05
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	5	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 Trace below quantitation limit

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LABORATORY REPORT

EPA METHOD 602 -- PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: CALCO Inc.
REPORT DATE: October 28, 1992
DATE SAMPLED: October 12, 1992
DATE RECEIVED: October 12, 1992
ANALYSIS DATE: October 27, 1992

PROJECT CODE: GICA1455
REF.#: 37,038
STATION: Duplicate
TIME SAMPLED: 12:25
SAMPLER: Tourangeau/Murray

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	2.2
Chlorobenzene	2	ND ¹
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	1	19.6
Xylenes	1	ND
MTBE	5	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 8

NOTES:

1 None detected

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ENDYNE, INC.

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CHAIN-OF-CUSTODY RECORD

0075-10

Project Name: <i>CR-02-01</i>	Reporting Address: <i>CR-02-01</i>	Billing Address: <i>CR-02-01</i>
Site Location: <i>CR-02-01</i>	Contact Name: <i>CR-02-01</i>	Sampler Name: <i>CR-02-01</i>
Endyne Project Number: <i>CR-02-01</i>	Company/Phone #: <i>CR-02-01</i>	Company/Phone #: <i>CR-02-01</i>

[illegible]

Relinquished by: Signature <i>[Signature]</i>	Received by: Signature <i>[Signature]</i>	Date/Time 10/12/92 4:30 pm
Relinquished by: Signature	Received by: Signature	Date/Time

Requested Analyses

Requested Analyses											
1	pH	6	TKN	11	Total Solids	16	Metals ICP/AA	21	EPA 624	26	EPA 8270
2	Chloride	7	Total P	12	TSS	17	Fecal and/or Tot.	22	EPA 625 B/N or A	27	EPA 8010
3	Ammonia N	8	Total Diss. P	13	TDS	18	OOD	23	EPA 418.1	28	EPA 8020
4	Nitrite N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB	29	EPA 8060
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240	30	EPTOX
31	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
32	Other (Specify):										

LABORATORY: WHITE

PROJECT MANAGER: YELLOW

SAMPLER: PINK



CHAIN-OF-CUSTODY RECORD

0057

Requested Analyses

Requested Analyses											
1	pH	6	TKN	11	Total Solids	16	Metals ICP/AA	21	EPA 624	26	EPA 8270
2	Chloride	7	Total P	12	TSS	17	Fecal and/or Tot.	22	EPA 625 B/N or A	27	EPA 8010
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8020
4	Nitrite N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB	29	EPA 8060
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240	30	EPTOX
31	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
32	Other (Specify):										

SAMPLER: PINK